QUINN EMANUEL URQUHART & SULLIVAN, LLP
Alex Spiro (appearing *pro hac vice*)
alexspiro@quinnemanuel.com
Andrew J. Rossman (appearing *pro hac vice*)
andrewrossman@quinnemanuel.com
Ellyde R. Thompson (appearing *pro hac vice*)
ellydethompson@quinnemanuel.com
51 Madison Avenue, 22nd Floor
New York, New York 10010
Telephone: (212) 849-7000

Michael T. Lifrak (Bar No. 210846)
michaellifrak@quinnemanuel.com
Anthony P. Alden (Bar No. 232220)
anthonyalden@quinnemanuel.com
865 South Figueroa Street, 10th Floor
Los Angeles, California 90017-2543
Telephone: (213) 443-3000

Attorneys for Defendants Tesla, Inc., Elon Musk, Brad W. Buss, Robyn Denholm, Ira Ehrenpreis, Antonio J. Gracias, James Murdoch, Kimbal Musk, And Linda Johnson Rice

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

IN RE TESLA, INC. SECURITIES LITIGATION	Case No. 3:18-cv-04865-EMC **MOTION *IN LIMINE* NO. 5** **DEFENDANTS' MOTION *IN LIMINE* TO EXCLUDE THE OPINIONS OF STEVEN HESTON AND MICHAEL HARTZMARK'S OPINIONS THAT RELY ON THEM**

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INTRODUCTION

Professor Steven Heston offers a purely theoretical model for calculating damages to Tesla option holders that seeks to impose a "one-size-fits-all" solution to over 2,400 different Tesla options traded during the class period, including buys and sells of puts and calls across an array of strike prices and maturities. Dr. Michael Hartzmark then implements Heston's predictions to calculate damages to all Tesla option holders during the class period. Heston's model is junk financial engineering and both it, and Hartzmark's opinions that rely on it, should be excluded for four reasons.

First, Heston does not compare actual Tesla option prices or quotes with "but for" prices, as is standard, accepted practice. Instead, he calculates theoretical prices for 17 synthetic Tesla instruments that *never traded* and then applies these theoretical prices to over *2,400 different Tesla options* that traded during the class period. Despite having *actual market data*, Heston chose to ignore it—instead comparing one set of model-generated price predictions to another set of model-generated price predictions—never endorsed by either academic literature or a court.

Second, the predicable result of Heston's novel methodology is that it assigns damages to class members who ***profited*** from option trades, and even awards damages to some investors greater than their purchase prices—a nonsensical result. This occurs over *100 times* in Hartzmark's calculations.

Third, despite admitting his model is "wrong" and does not accurately predict Tesla option prices, Heston made no attempt to calculate an error rate or otherwise quantify how wrong it is. To the contrary, his unscientific attempts to bolster his predictions by "eyeballing" how often they fall within certain nonsensical bounds in fact shows his predictions are consistently incorrect.

Finally, because Hartzmark's opinions concerning damages to option holders, and "direct" damages to stockholders, rely on Heston's unreliable model, they too must be excluded. Worse, Hartzmark assumes, without any analysis, that a key input into his options model—movements of implied volatility—were solely caused by Mr. Musk's tweets. Despite admitting they could have done so, neither Hartzmark nor Heston did an event study on implied volatilities to test this assumption. Courts routinely exclude damages opinions where, as here, experts simply assume causation.

ARGUMENT

I. PROFESSOR HESTON'S METHODOLOGY FOR CALCULATING DAMAGES TO OPTIONS INVESTORS IS UNRELIABLE AND SHOULD BE EXCLUDED

A. Professor Heston's Methodology. Heston proposes the following methodology for calculating damages to Tesla option holders:

First, Heston creates a synthetic Tesla instrument, known as an at-the-money ("ATM") forward straddle. This instrument was not actually traded in the market. Rather, Heston manufactures it from the prices of four Tesla options: a Tesla put option and call option just below the money, and a Tesla put option and call option just above the money. Ex. C at 73:7-19.

Second, using the calculated price of this theoretical instrument, Heston calculates "implied volatility" using the Black-Scholes formula.[1] Heston contends that changes in option prices can largely be predicted based on stock price and implied volatility. Ex. 368 ¶ 71.

Third, Heston calculates the price for his theoretical ATM-forward straddle, and a corresponding implied volatility, for 17 Tesla option maturities traded during the class period.

Fourth, Heston plugs into his formula the stock price on each day of the class period and the implied volatilities he calculates for the 17 ATM forward straddles, to derive a "re-valued fitted option value" for the 2,400 Tesla options traded during the class period. *Id.* ¶ 165.a.-b.

Finally, Heston proposes that a "but-for" option price can be calculated for each Tesla option traded during the class period by plugging into his formula a "counterfactual implied volatility and stock price." *Id.* ¶ 183. He contends that the difference between the "re-valued fitted option value" and the "but-for option price" is the price impact of Mr. Musk's tweet. *Id.* ¶ 165.c.-d.

B. Professor Heston's Methodology Is Speculative And Unreliable. Heston's methodology is junk financial engineering with no resemblance to reality. Rather than compare the actual transaction prices of Tesla options during the class period to "but-for" option prices—as is standard practice—Heston (a) calculates prices on just 17 theoretical Tesla instruments, (b) uses

[1] For the purposes of this motion only, Defendants do not dispute that the Black-Scholes formula can be used to predict option prices in certain circumstances. It is the unprecedented way Heston uses the formula in this case that is so problematic.

the theoretical prices he calculates on these 17 instruments to calculate theoretical prices on over 2,400 different Tesla options traded during the class period, and (c) then proposes to compare these theoretical prices to other theoretical prices (the "but for" prices) to calculate damages.

It is axiomatic, however, that an expert must rely on sufficient, accurate data. *See*, *e.g.*, *Rowe Entm't, Inc. v. William Morris Agency, Inc.*, 2003 WL 22124991, at *4 (S.D.N.Y. Sept. 15, 2003) (an "analysis is only as good as the data upon which it rests"). Here, Heston did not rely on actual market prices for the overwhelming majority of Tesla options traded during the class period. Instead, he calculated theoretical prices for only 17 theoretical Tesla instruments and then applied them to over 2,400 different Tesla options with markedly different strike prices, maturities, and moneyness. *See* Ex. C at 71:20-24 ("Q. So the approach that you used of calculating an impact quantum was not comparing – am I correct, sir, it was not comparing actual transacted prices to theoretical but-for prices? A. That's correct."); *id.* 309:8-14 (accord). Heston testified that the reason he took this short-cut was because he did not have the market data. *Id.* at 93:12-15 ("So the answer to my question is you didn't have actual transacted prices you can look at for that starting point, right? A. That's correct."). But Plaintiff ***did have the data***. He produced it in this case.

The result of Heston's decision not to use actual transaction prices or quotes—for which he could not identify any precedent—is that both the theoretical prices he calculated, and the differences between them, are ***demonstrably wrong***. This is because, as Heston admitted, his model does not accurately predict option prices. *Id.* at 249:9-17 (Q. . . . And I think you – you agreed with me that your model is not designed to accurately predict levels [*i.e.*, prices]? A. That's right."). For example, according to Hartzmark—using Heston's methodology—an investor who sold a Tesla call option with a January 2020 expiration and $500 strike price at market closing on August 7, 2018, was damaged by $2.18 because the option price was *deflated* by that amount. Ex. 375 Appx. 8 at 17. However, had Heston calculated, and Hartzmark used, the implied volatility of the particular option being analyzed—rather than that of Heston's ATM forward straddle—he would have concluded that the option price was actually *inflated*, *i.e.*, the investor actually benefitted. Ex. 370 ¶ 25.

Indeed, Heston's model not only leads to erroneous damages numbers, but ***nonsensical ones***. For example, according to Hartzmark—using Heston's methodology—an investor who bought a Tesla

call option with a September 21, 2018 expiration and $420 strike price on August 7, was damaged by $8.00. Ex. 375 Appx. 8 at 7. But the actual mid-price of that option on that day was only ***$4.50***. Ex. C at 75:9-21; Ex. D. In other words, according to Hartzmark, this investor's losses exceeded her investment—an impossibility. This happens over *100 times* in Hartzmark's calculations. Ex. D.

Neither Heston nor Hartzmark dispute these absurd results. Instead, Heston argues that his model will get it right *most of the time* and Hartzmark makes reference to a statutory cap but fails to explain how imposing an arbitrary cap could possibly salvage his flawed model. *See* Ex. 369 at 9-10; Ex. C at 123:10-15 (discounting inaccuracies because "some of those options aren't worth very much"); Ex. 375 ¶ 227 ("[T]he model results could yield inflation or deflation higher than the transaction price . . ., but any such issue would be mitigated should the finder of fact determine that the application of a cap on damages as prescribed by the PSLRA as appropriate."). But Plaintiff's methodology must reliably calculates damages to *all* class members for *all* options—not just for some options some of the time. *See In re Apple Inc. Sec. Litig*., 2022 WL 354785, at *13 (N.D. Cal. Feb. 4, 2022) ("[G]iven the varying characteristics of the 2,282 distinct Apple stock options . . ., [the expert] offers nothing in either of his reports to satisfy the Court that individualized issues pertaining to damages to option holders will not predominate.").

Even worse, Heston admits that, even though his model is "wrong," he did not calculate an error rate or any other measure of how "wrong" his model is. Ex. C at 173:18-24; *id.* 170:25-171:2 ("I did not calculate the percentage error and levels on the Black-Scholes model compared to another model."). Instead, Heston manufactured two "bid-ask bounds" of blue and yellow dots, and opined—based on merely eyeballing them—that many of his model's predictions (the red dots) "largely" fell between them. Ex. 369 ¶¶ 37-38.

But Heston's "bid-ask bounds" make no sense. Rather than measuring how often his model's prediction of the price change of a Tesla option matched the actual price change, Heston calculated how often his predicted price change fell within a bid-ask spread, where the bid is taken from one day and the ask from another. Ex. 369 ¶ 37 n. 27. This does not compare apples to apples. The comparison should be between two purchase prices or two sale prices, or between an actual purchase or sale price and the but-for purchase or sale price, respectively. *In re Imperial Credit*, 252 F. Supp.

2d 1005, 1014 (C.D. Cal. 2003) ("Damages in a securities fraud case are measured by the difference between the price at which a stock sold and the price at which the stock would have sold absent the alleged misrepresentations or omissions.").

More fundamentally, Heston admits that his predicted option prices, and differences between them, ***do not even fall within his own bounds most of the time***. Ex. C at 228:6-229:19 ("So when you say 'they largely fall within the bid-ask,' 40% of them are outside the boundary that you create. Any reason to dispute that? A. Not now."); 240:14-242:18 . As Exhibit E shows, across each of Heston's four tests, his predictions fall outside his own bounds an average of ***47% of the time***.[2]

In short, Heston's proposed methodology for calculating damages to Tesla option holders is junk financial engineering. Even though he had access to actual market prices and quotes for Tesla options during the class period, he largely ignored them. Instead, he calculated theoretical prices on just 17 theoretical instruments and then applied the implied volatilities from these theoretical instruments to over 2,400 different Tesla options with completely different characteristics. The result of these inexcusable shortcuts is that Heston himself admits his model is consistently "wrong." And because Hartzmark's opinions regarding options damages are based entirely on Heston's unreliable model, Ex. 375 ¶¶ 214-228, Hartzmark's opinions should likewise be excluded.

II. DR. HARTZMARK HAS FAILED TO RELIABLY ISOLATE THE IMPACT OF THE MUSK TWEETS ON OPTION HOLDERS

Hartzmark uses Heston's model in two relevant ways. *First*, as noted above, Hartzmark calculates the damages to Tesla option holders caused by Mr. Musk's tweet as the difference between Heston's "re-valued fitted option values" and "but-for" option prices—*i.e.*, option inflation or deflation. These "re-valued fitted option values" and "but-for" option prices have two key inputs: Heston's calculated implied volatilities and Tesla stock prices. Ex. 368 ¶ 183; Ex. 375 ¶ 215.

Second, Hartzmark relies on Heston's model to apportion damages to stock holders into "direct" and "consequential" components. To make this division, Hartzmark uses the implied

[2] Heston's contention that his predictions are "close" to the bounds only begs the question: why calculate bounds if predictions outside them are good enough? Heston also presents no analysis of "closeness" or how "close" his predictions actually are.

volatilities Heston calculated for just one of his theoretical instruments, a January 2020 ATM-forward straddle. Ex. 375 ¶ 193. Specifically, Hartzmark first contends that "direct" inflation at market close on August 7, 2018 was $23.27, while it was zero at market close on August 17, 2018. *Id.* ¶¶ 178, 197. At the same time, the implied volatility of the January 2020 ATM-forward straddle (as calculated by Heston) was 33% on August 7, 2018, and increased to 49% on August 17, 2018. *Id.* ¶ 197. Hartzmark translates these changes in implied volatility into proportional decreases in "direct" inflation of the stock price using a "scalar." *Id.* ¶ 201. For example, according to Heston, on August 8, implied volatility had increased by 5% to 37%, which is 28% of the total increase in implied volatility of 16%.[3] As a result, Hartzmark assumes that on August 8, 28% of the "direct" inflation has dissipated, or $16.75 of "direct" inflation remained.[4] He then simply assumes that the remaining difference in stock prices is attributable to "consequential" damages. *Id.* ¶ 204 and Table 9.

The fatal problem with Hartzmark's use of Professor's Heston's calculation of implied volatilities to calculate option damages, and to estimate "direct" inflation of Tesla stock prices, is the lack of any evidence that the changes in implied volatilities were caused solely by Mr. Musk's tweets and alleged corrective information. Heston admitted it was certainly possible that industry factors or other statements could have caused the changes. Ex. C at 269:10-21 ("I really don't have an opinion on why the volatility of Tesla or other things change. I'm not denying that this [impact of industry factors] is possible, but I have not formed an opinion on why prices change"); *Id.* at 275:12-18 (same).

Heston and Hartzmark could have done an event study on implied volatilities during the class period. Even Plaintiff's consultants, Fideres Partners, recommend doing so. Ex. F ("Option pricing models can be adapted to the event study framework and used to estimate damages on option positions in 10b5 claims."). Yet, neither Heston nor Hartzmark did so. Ex. C at 23:3-12 ("Q. Were you asked to do that [*i.e.*, an event study] in this case? A. No, I was not asked to do an event study."); Ex. G at 127:6-7 ("I did not do an event study with respect to options.").

[3] 28.05% = (37.08% - 32.57%) / (48.65% - 32.57%) ~= 5% / 16%.

[4] $16.75 = (1 – 28.05%) * $23.27.

Courts routinely preclude expert opinions in securities cases that assume causation without doing an event study. *See In re Imperial Credit Indus., Inc. Sec. Litig.*, 252 F. Supp. 2d at 1015 ("[A] number of courts have rejected or refused to admit into evidence damages reports or testimony by damages experts in securities cases which fail to include event studies or something similar.") (collecting cases); *In re Oracle Sec. Litig.*, 829 F. Supp. 1176, 1181 (N.D. Cal. 1993) (accord).

Plaintiff will likely make three arguments in an attempt to salvage Hartzmark's opinions on options damages. Each are meritless. *First*, Plaintiff may argue that Hartzmark's analysis of the efficiency of the market for Tesla options in his class-certification report is a sufficient event study. *See* Dkt. No. 291-1 § VII. But that analysis (a) did not examine implied volatilities, (b) did not attempt to tease out the impact of confounding variables on either implied volatilities or option prices, and (c) was not used by Hartzmark in his calculation of damages to option holders. Hartzmark admits he "did not do an event study with respect to options." Ex. G at 127:6-7.

Second, Plaintiff may contend that Hartzmark's methodology for determining the but-for stock prices uses an event study, and stock prices are an input to the option pricing model. But, as discussed above, stock prices are only one of two inputs to the option damages model. The other is changes in Heston's implied volatilities. It was thus not enough for Hartzmark to purport to control for the impact of confounding variables on Tesla stock prices. He needed to do the same thing for the implied volatilities. Inexplicably, he did not.

Third, Plaintiff may point to Heston's opinion that, "[o]n August 7, 2018 the large long-term ATM-forward straddle price *decreases* accompanied large short-term ATM-forward straddle price *increases*." Ex. 368 ¶ 138. According to Heston, this "indicates that the drop in long-term implied volatility was not due to market-wide forces, but rather was specific to Tesla." *Id.* ¶ 141. But Heston admitted that he had no idea what caused the alleged drop in "long-term implied volatility." Ex. C at 269:10-21; *id.* at 268:2-6; *id.* 274:21-275:18 (same). Heston did no analysis of statements made during the class period on option prices or implied volatility.

Because Hartzmark's calculation of damages to Tesla option investors, and division of damages into "direct" and "consequential," relies on an assumption of causation unsupported by standard empirical analysis, it should be excluded as unreliable.

CONCLUSION

For the foregoing reasons, Defendants respectfully request that the Court exclude Heston's opinions and Hartzmark's opinions to the extent they rely on them.

DATED: September 20, 2022

Respectfully submitted,

QUINN EMANUEL URQUHART & SULLIVAN, LLP

By: */s/ Alex Spiro*

Alex Spiro (appearing *pro hac vice*)
Andrew J. Rossman (appearing *pro hac vice*)
Anthony P. Alden (Bar No. 232220)

Attorneys for Tesla, Inc., Elon Musk, Brad W. Buss, Robyn Denholm, Ira Ehrenpreis, Antonio J. Gracias, James Murdoch, Kimbal Musk, And Linda Johnson Rice